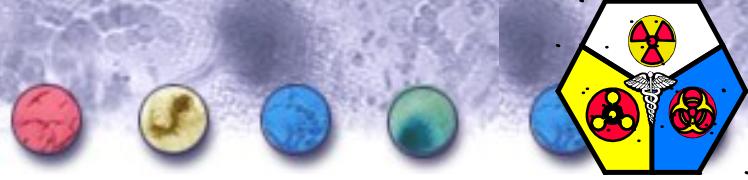


# *Medical NBC Briefing Series*

## *Medical NBC Aspects of*

## Japanese Encephalitis





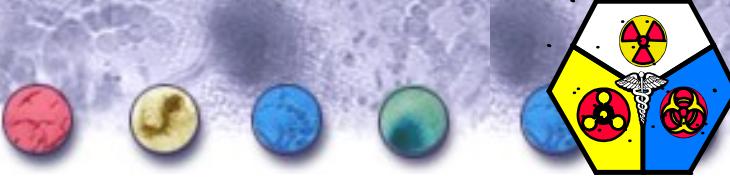
# Purpose

- *This presentation is part of a series developed by the Medical NBC Staff at the U.S. Army Office of The Surgeon General.*
- *The information presented addresses medical issues, both operational and clinical, of various NBC agents.*
- *These presentations were developed for the medical NBC officer to use in briefing either medical or maneuver commanders.*
- *Information in the presentations includes physical data of the agent, signs and symptoms, means of dispersion, treatment for the agent, medical resources required, issues about investigational new drugs or vaccines, and epidemiology.*
- *Notes page*



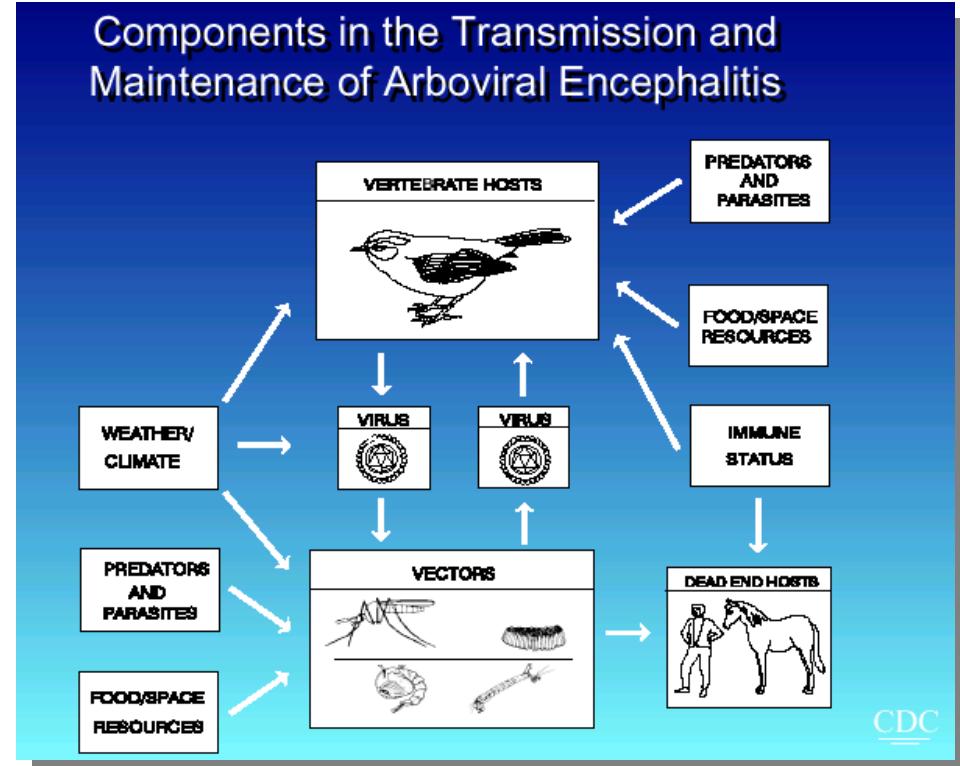
Office of the Surgeon General  
for the Army

ence.



# Outline

- **Background**
- **Battlefield Response**
- **Medical Response**
- **Command and Control**
- **Summary**
- **References**





# Background

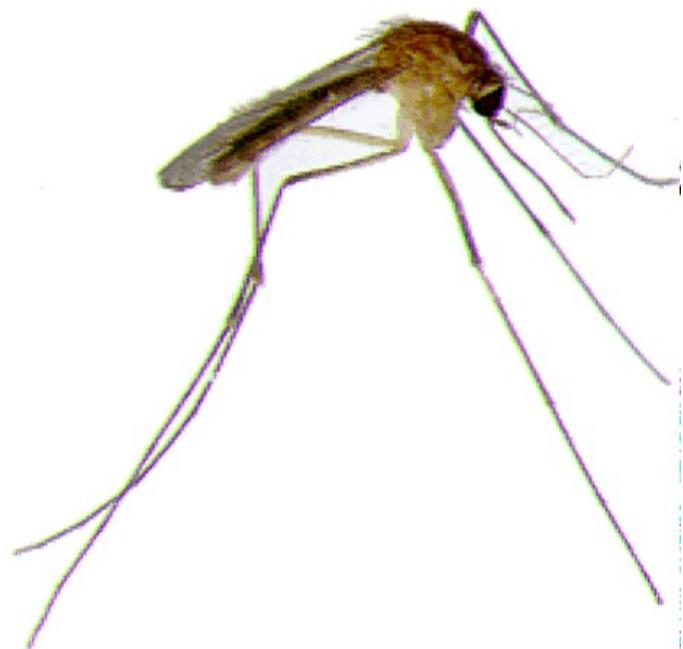


- **Disease Background**
- **Disease Course Summary**
- **Signs and Symptoms**
- **Diagnosis**
- **Treatment**
- **Current Situation**
- **Weaponization**



# Disease Background

- **Japanese encephalitis (JE) is a mosquito-borne virus common in Asia**
- **Most people who are infected with the virus never show any outward symptoms**
- **Those who do exhibit symptoms face a life-threatening situation**
- **Vaccine available**
- **Treatment is supportive**
- **First clinically described in Japan as early as 1871**

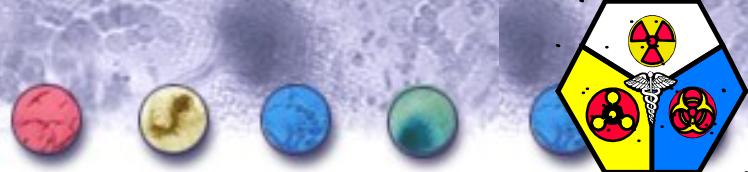




# Disease Course Summary for Severe Cases of JE

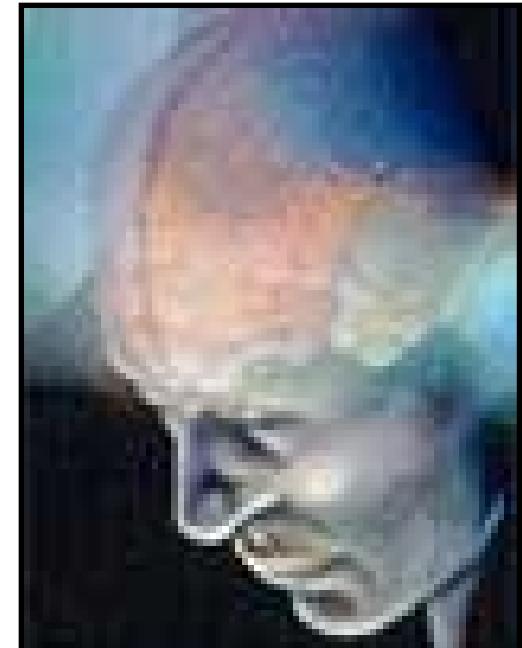
## in Untreated Individuals

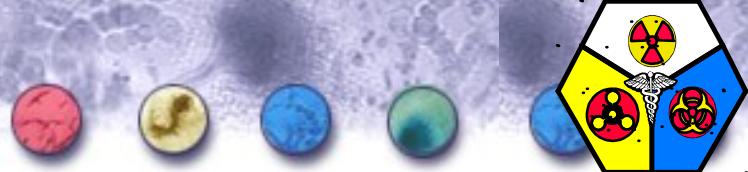
Day 1 <b>EXPOSURE</b>	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
<b>Incubation from 5 to 15 days</b>						
Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
<b>Incubation from 5 to 15 days</b>						
Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21
<b>Severe cases of JE can cause neck stiffness, light sensitivity, disturbances in behavior, seizures, loss of consciousness, muscle weakness or paralysis, and death</b>						
Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28



# Signs and Symptoms

- **Most people never show any symptoms**
- **Early symptoms mimic the flu**
- **Occasional development of joint pain and rash**
- **Severe infections are marked by neck stiffness, pain in the eyes when looking at light, disturbances in behavior, seizures, loss of consciousness, muscle weakness or paralysis, and possible death**

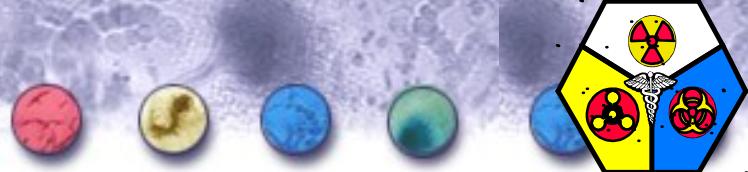




# Diagnosis

- **Difficult to diagnosis clinically**
  - JE is one of many causes of encephalitis
  - Symptoms are nonspecific
  - Presumptively diagnose illness as one of the forms of encephalitis
- **Diagnosis of JE requires a blood test and/or spinal tap**
- **Antibody to any of the *Flavivirus* group may react with the JE viral antigen**





# Treatment

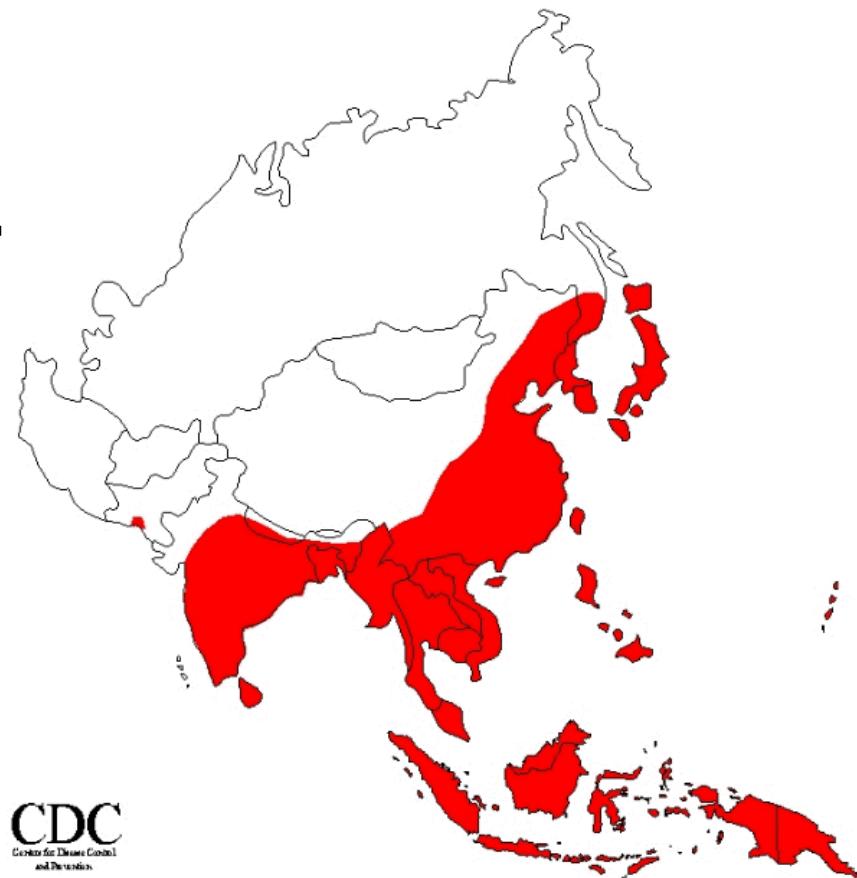
- **No cure for JE**
- **Primarily supportive care**
  - Feeding
  - Airway management
  - Seizure control
  - Prevention of secondary complications such as bacterial infections
- **Antibiotics are NOT effective**



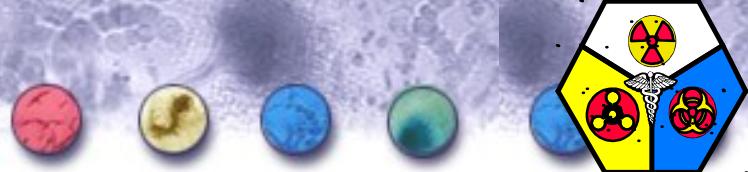


# Current Situation

- **35,000 - 50,000 symptomatic cases develop per year**
- **From 1978 - 1993, 12 cases occurred in the U.S.**



**CDC**  
Centers for Disease Control  
and Prevention



# Weaponization

- **Threat risk**

- Several countries have examined JE as a possible biological weapon
- Most people infected with JE are asymptomatic or develop only mild symptoms
- Therefore, JE is an unlikely choice for a biological attack on the battlefield

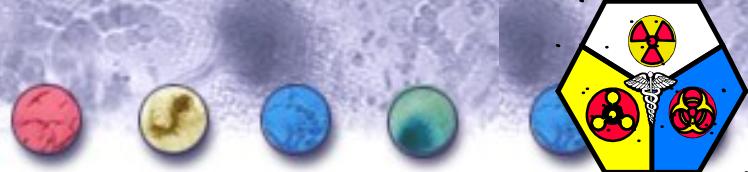
- **Aerosolization**

- Highly infectious via aerosol
- Delivery systems can be simple, such as spray systems or stationary munitions

- **Arthropod vectors**

- Cause widespread outbreaks
- Longer-term epidemic than aerosol





# Battlefield Response to Japanese Encephalitis

- **Detection**
  - Environmental detection
  - Clinical detection
  - Medical surveillance
- **Protection**
  - Vaccination
  - Individual protection
  - Collective protection

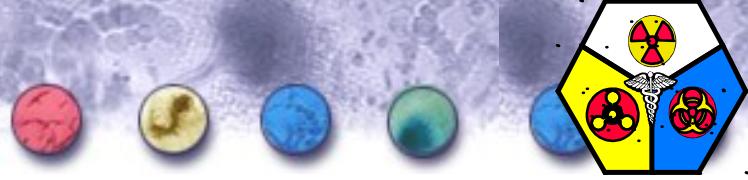




# Detection

- **Possible methods of detection**
  - Detection of agent in the environment
  - Clinical (differential diagnosis)
  - Medical surveillance (coordination enhances detection capability)
- **Diagnosis of Japanese encephalitis is not presumptive of a BW attack**

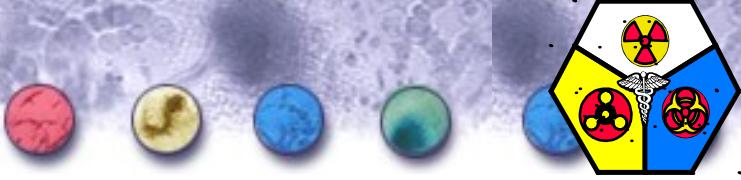




# **Detection of Agent in the Environment**

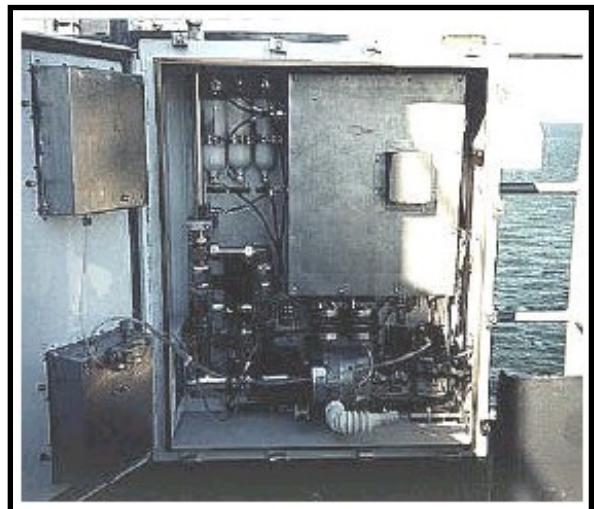
- **Biological Smart Tickets**
- **Enzyme Linked Immunosorbant Assay (ELISA) (Fielded with the 520th TAML)**
- **Polymerase Chain Reaction (PCR) (Fielded with the 520th TAML)**

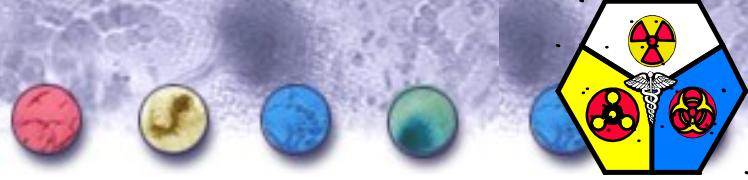




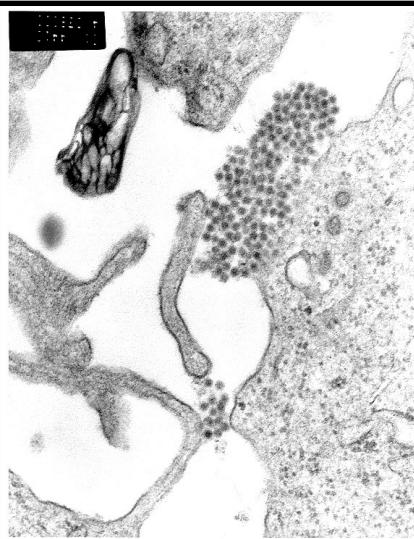
# Detection of Agent in the Environment (cont.)

- **M31E1 Biological Integrated Detection System (BIDS)**
- **Interim Biological Agent Detector (IBAD)**





# Clinical Detection



- **Clinical presentation**
  - Difficult to diagnosis clinically
  - JE is one of many causes of encephalitis
  - Symptoms are nonspecific
  - Presumptively diagnose illness as one of the forms of encephalitis
- **Laboratory confirmation**
  - Division medical assets may lack lab equipment to conduct test to determine JE
  - Specimen must be sent to theater level or CONUS lab
  - Contact lab prior to collection or preparation in order to assure proper methods are utilized



# Detection by Medical Surveillance

 MARYLAND ARMY NATIONAL GUARD  
DISCOM 29th Infantry Division (Light)  
DIVISION MEDICAL OPERATION CENTER (DMOC)



Patient Summary Report  
29th INF (L) DIV

From: Division Medical Operations Center (DMOC)  
To: Division Surgeon

Date Time Group: From: 121200RJUN99  
To: 202400RJUN99

PATIENTS

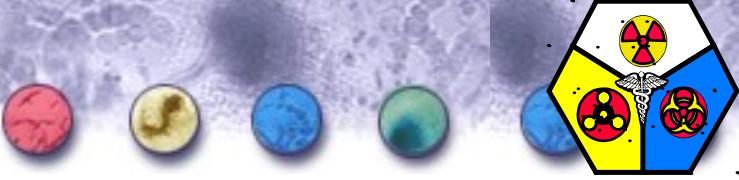
Nation	WIA	NBI	Disease	Neuropsychiatric Stress-Related	Total
US	0	97	55	0	152
Allied	0	0	0	0	0
EPW	0	0	0	0	0

DISPOSITION

Return to duty		148
Holding in Division's MTFs		0
Evacuated and returned		3
Evacuated by air		0
Evacuated by ground		1
Expired en route		0
Expired in MTF		0

## Clues in the daily medical disposition reports

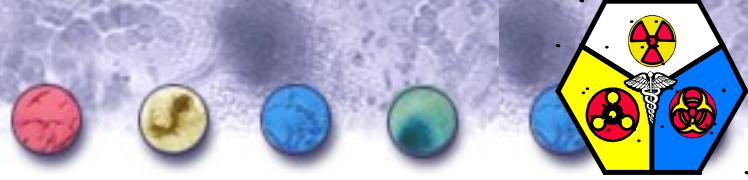
- Large numbers of individuals in the same geographic area presenting with flu-like symptoms, a slight fever, and headache
- Smaller number of severe cases of illness
- Difficult to distinguish



# Protection by Vaccination

- Licensed vaccine
- Local reactions and mild systemic side effects (fever, headache, myalgia, and malaise) in about 20% of vaccinees

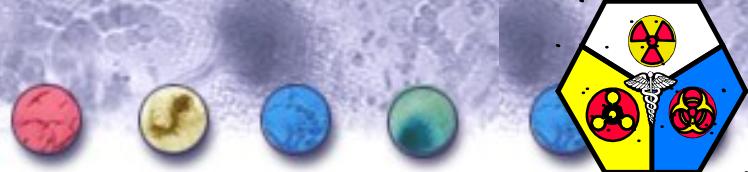




# Individual Protection

- **Mask and BDO with gloves and boots**
- **Standard uniform clothing affords reasonable protection against dermal exposure to biological agents**
- **Casualties in contaminated areas**
  - A casualty suffering from JE does not necessarily need to wear MOPP or be in a casualty wrap since they are already infected
  - Having a casualty suffering from

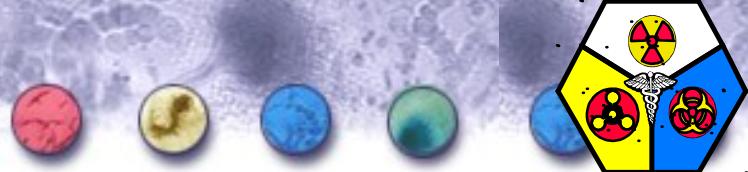




# Collective Protection

- **Hardened or unhardened shelter equipped with an air filtration unit providing overpressure**
- **Standard universal precautions should be employed as individuals are brought inside the collective protection units**
- **JE is not communicable from person to person**





# Medical Response to Japanese Encephalitis

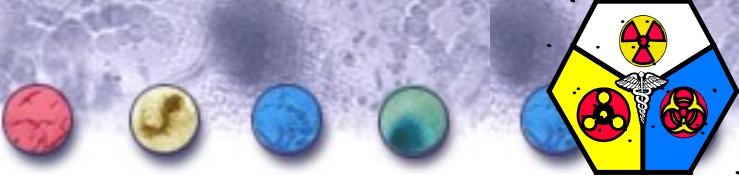
- Triage and Evacuation
- Evacuation or Quarantine
- Infection Control
- Resource Requirements





# Triage and Evacuation

- **Triage**
  - Priorities based on severity of symptoms
  - Need to differentiate from other BW agents that present with flu-like symptoms such as anthrax
- **Evacuation**
  - Need for evacuation will depend on severity of symptoms and METT-T
  - Standard infection control precautions during transport
  - May consider treatment in place or even outpatient treatment for a mass casualty



# Evacuation or Quarantine



Figure 8-6. Arms carry.

- **Evacuation**

- Most patients show only mild symptoms and can RTD in the normal theater evacuation policy of 15 days

- **Quarantine**

- Not communicable person to person but can be spread through mosquitoes
  - Quarantine may limit spread
  - Unlike smallpox, JE is already endemic

- **Guidance**

- Seek guidance from CINC and MTF Commanders before evacuating large numbers of patients

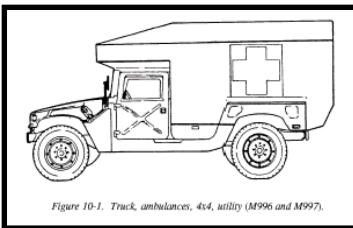
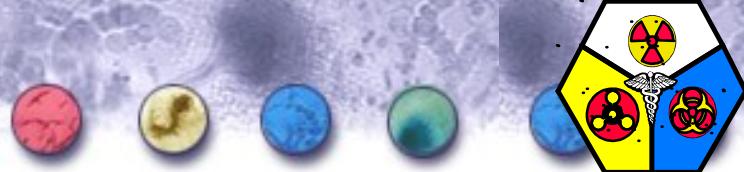


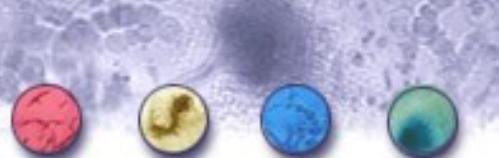
Figure 10-1. Truck, ambulances, 4x4, utility (M996 and M997).



# Infection Control

- **No reported cases of direct person to person transmission**
- **Transmitted through vectors (mosquitoes)**
- **Protect against vectors**
- **Use standard universal precautions during treatment**





# Resource Requirements

- Medication
- Treatment facilities
- Supportive therapies
- Intensive care facilities for severely ill patients
- Possibility for in-theater treatment of large numbers of patients
- Repellents and other control means to prevent the spread by vectors

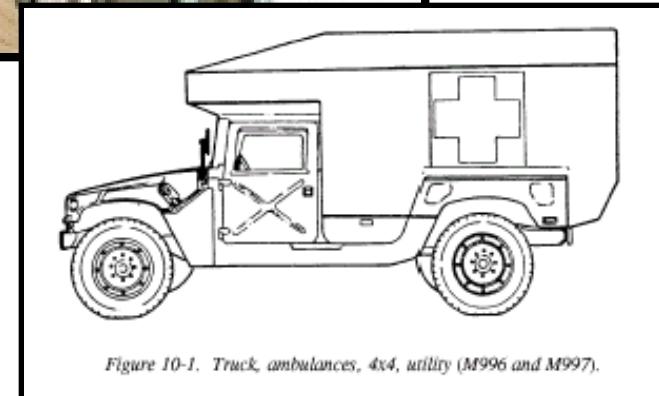
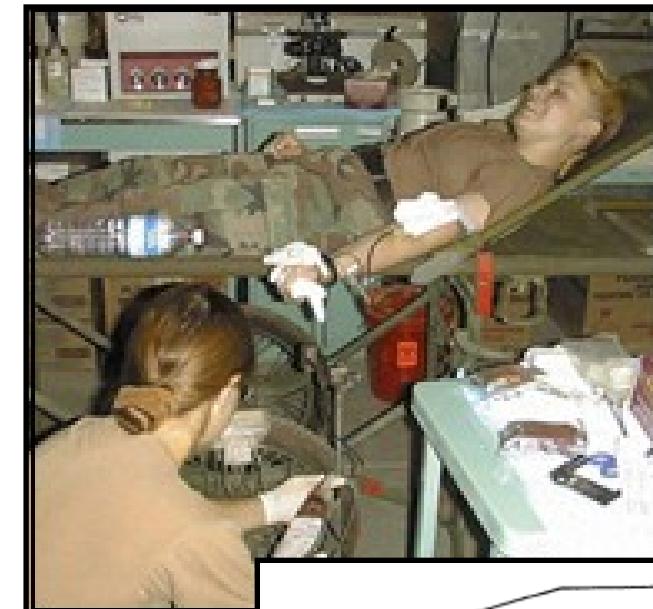
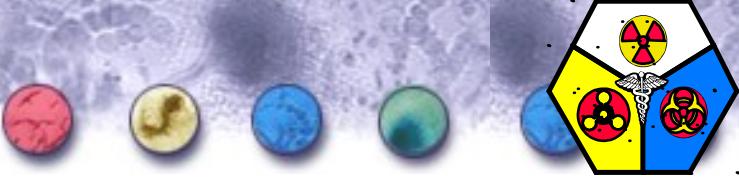


Figure 10-1. Truck, ambulances, 4x4, utility (M996 and M997).



# Command and Control



- **Considerations**
- **Response to Psychological Impact**



# Considerations

- **Intelligence**
  - Medical surveillance and intelligence reports are key to keep the Command alert to the situation
- **Outpatient treatment, In-theater treatment, or Evacuation**
- **Maneuver**
  - Quarantine, if imposed, may limit maneuverability of units
- **Infection Control**
  - Command responsibility to ensure proper infection control, field sanitation, and personal hygiene measures
- **Manpower**
  - While a large percentage of the fighting force may become infected, most will be asymptomatic or develop only mild symptoms
- **Logistics**
  - Additional Class VIII materials will be required and evacuation routes to Echelon III will be heavily utilized



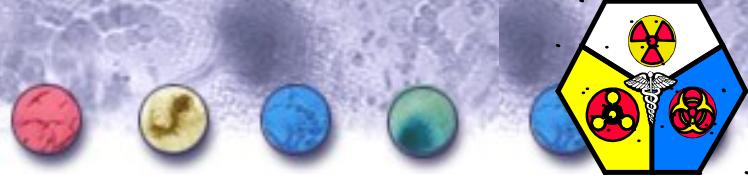
# Response to Psychological Impact

- **May vary from person to person**
- **Psychological Operations**
  - Rumors, panic, misinformation
  - Soldiers may isolate themselves in fear of disease spread
- **Countermeasures**
  - LEADERSHIP is responsible for countering psychological impacts through education and training of the soldiers
  - Implementation of defensive measures such as crisis stress management teams



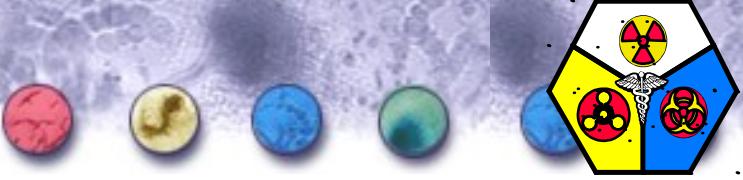
# Summary

- JE is endemic to the U.S. and other parts of the world
- JE is transmitted by vectors
- The possibility for weaponization exists, but JE is an unlikely choice
- Detection may not occur until after exposure when patients are reported
- Command decisions that will be required upon detection of JE include the following:
  - Far-forward treatment, treatment at MFT, or evacuation to CONUS?
  - Additional resources<sup>29</sup> for far-forward treatment



# References

- Bayonet.Net website: [www.bayonet.net](http://www.bayonet.net).
- Biological and Chemical Warfare Online Repository and Technical Holding System (BACWORTH), Version 3.0. Battelle Memorial Institute, 1997.
- Department of Defense. *Annual Report to Congress for Chemical and Biological Defense Program*, March 2000.
- Department of the Air Force, Medical Service Corps. Slide presentation: *The 100 Greatest Military Photographs*.
- Department of the Army. FM 8-10-6: *Medical Evacuation in a Theater of Operations*, April 2000.
- Department of the Army. FM 8-9: *NATO Handbook on the Medical Aspects of NBC Defensive Operations*, February 1996.
- Department of the Army. FM 21-10: *Field Hygiene and Sanitation*, November 1988.
- E Medicine website: [www.emedicine.com/med/topic3158.htm](http://www.emedicine.com/med/topic3158.htm).
- Healthy Me website: [www.ahealthyme.com/topic/topic100587037](http://www.ahealthyme.com/topic/topic100587037).
- National Research Council and Institute of Medicine, *Chemical and Biological Terrorism, Research and Development to Improve Civilian Medical Response*, Washington DC: National Academy Press, 1999.
- Third World Traveler website: [www.thirdworldtraveler.com](http://www.thirdworldtraveler.com).
- Website for the American Headache Society: [www.ahsnet.org](http://www.ahsnet.org).
- Website for the ARUP Laboratories: [www.aruplab.com/about/overview.htm](http://www.aruplab.com/about/overview.htm).
- Website for the Center for Disease Control and Prevention: [www.cdc.gov/travel/jenceph.htm](http://www.cdc.gov/travel/jenceph.htm).
- Website for the Florida Medical Entomology Laboratory: [www.ifas.ufl.edu/~veroweb/online/sle.htm](http://www.ifas.ufl.edu/~veroweb/online/sle.htm).
- Website for the Mount Sinai Hospital, Department of Microbiology, Toronto, Canada: [microbiology.mtsinai.on.ca/Bug/flu/flu-bug.htm](http://microbiology.mtsinai.on.ca/Bug/flu/flu-bug.htm).
- Website for the Nikon Microscopy: [www.microscopyu.com/galleries/dxm1200/culexlarge.html](http://www.microscopyu.com/galleries/dxm1200/culexlarge.html).
- Website for the Pasco County Mosquito Control District: [www.pasco-mosquito.org](http://www.pasco-mosquito.org).
- Website for the U.S. Army Center of Military History: [www.army.mil/cmh-pg](http://www.army.mil/cmh-pg).
- Website for the U.S. Army Medical Department Regiment, U.S. Army: [ameddregiment.amedd.army.mil/distinct.htm](http://ameddregiment.amedd.army.mil/distinct.htm).



**Battelle Memorial  
Institute created this  
presentation for the U.S.  
Army Office of The  
Surgeon General under  
the Chemical and  
Biological Defense  
Information Analysis  
Center Task 009, Delivery  
Number 0018.**